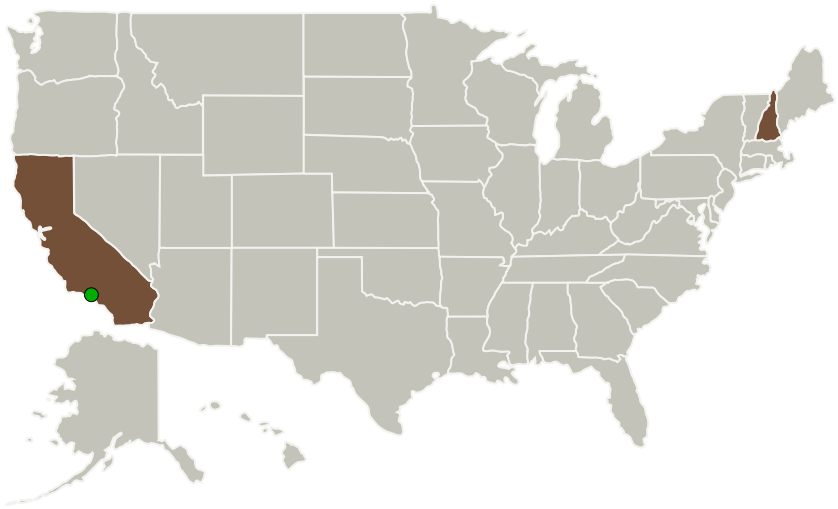
# A Miniature Compressor for In-Situ Resource Utilization on Mars, Phase II

Completed Technology Project (2015 - 2018)

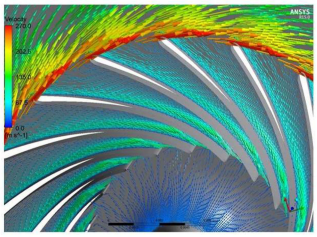
## Project Introduction

A key objective for NASA's next rover mission to Mars is the demonstration of oxygen production from atmospheric carbon dioxide. Such a technology demonstration may pave the way for a future sample return mission to the Red Planet as well as possibly a future manned mission to Mars. A necessary component in such a demonstration system is a blower or compressor that can deliver the necessary carbon dioxide mass flow to a production plant. Creare proposes the development of a radial flow compressor that is capable of a mass flow rate of more than 400 g/hr. The compressor will be a turbomachine based on our space qualified vacuum pump technology currently operating on the Curiosity rover in the SAM instrument on Mars. In Phase II, we propose to design, build, test, and deliver a compressor that is qualified to TRL 6 and ready for integration into a flight system.

## Primary U.S. Work Locations and Key Partners



| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| Creare LLC | Lead Organization | Industry | Hanover, New Hampshire |
| Jet Propulsion Laboratory(JPL) | Supporting Organization | NASA Center | Pasadena, California |



The Gas Flow Around the Compressor Impeller Blades Is Modeled in CFD

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| Primary U.S. Work Locations | |
|---|---|
| California | New Hampshire |

## Project Transitions

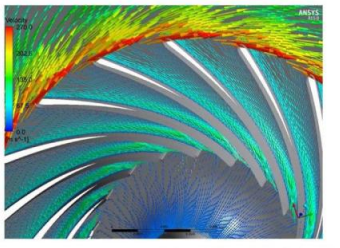
**May 2015:** Project Start

**May 2018:** Closed out

**Closeout Documentation:**

- Final Summary Chart*(https://techport.nasa.gov/file/137829)*

## Images



The Gas Flow Around the Compressor Impeller Blades Is Modeled in CFD

**Briefing Chart Image**
A Miniature Compressor for In-Situ Resource Utilization on Mars, Phase II
*(https://techport.nasa.gov/image/130384)*

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

Creare LLC

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

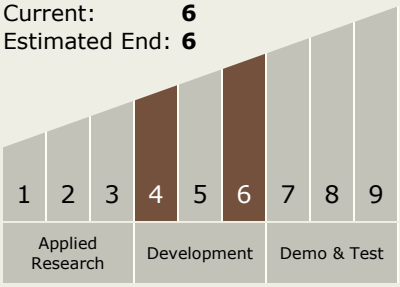
Carlos Torrez

**Principal Investigator:**

Robert K Schoder

## Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



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## Technology Areas

**Primary:**

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System